

Having described our invention, we claim:

1. A refrigerant material transfer device for transferring a refrigerant from a pressurized container to the connector on an automotive air conditioning system including:

an actuator adapted for attachment to the pressurized container for selectively receiving  
5 refrigerant material from the pressurized container,

a quick connect fitting fluidically connectable to the automotive air conditioning system,  
a fluid conveying tube fluidically connecting said fitting and said actuator to allow the flow  
of refrigerant material from said actuator to said quick connect fitting,

said quick connect fitting having

10 a one piece plastic body having one end attached to said tube and another end selectively  
attachable to and detachable from the air conditioning connector on the automotive air conditioning  
system, said plastic body having a fluid passageway extending from said one end attached to said  
fluid conveying tube to said other end for fluidically connecting to the automotive air conditioning  
system and,

15 a plastic locking sleeve mounted on said plastic body for selectively locking and unlocking  
said body to the air conditioning connector,

one of said body and said locking sleeve having at least one locking tab integrally formed  
therewith, said one locking tab having a hinge portion and a connector engaging lip pivotal about  
said hinge portion and engagable with the air conditioner connector, said one locking tab moveable  
20 between a secured position in which said connector engaging lip is engageable by the air  
conditioning connector and an unlocked position, said body and said locking sleeve movable with  
respect to each other between a tab unlocking position and a tab locking position to lock said locking

tabs in said secured position.

2. A refrigerant material transfer device as described in claim 1 in which the other of said body and said locking sleeve contacts said one locking tab in said tab locking position to lock said locking tabs in said secured position.

5           3. A refrigerant material transfer device as described in claim 2 in which said one locking tab has a raised portion, said raised portion in contact with said other of said body and said locking sleeve when in said tab locking position.

10           4. A refrigerant material transfer device as described in claim 1 in which said one of said body and said locking sleeve has at least one aperture therein for receiving said one locking tab therein.

5           5. A refrigerant material transfer device as described in claim 1 in which said one locking tab has an arm portion extending from said hinge portion to said connector engaging lip.

6. A refrigerant material transfer device as described in claim 1 in which said one locking tab includes a plurality of locking tabs.

15           7. A refrigerant material transfer device as described in claim 1 in which said body or said locking sleeve has at least one assembly prong and said body or said locking sleeve not having said one assembly prong having a prong engaging surface for engaging said one assembly prong, said one prong having a bearing surface in contact with said prong engaging surface, said prong engaging surface having a stop surface for contacting said one prong and restraining disassembly of said body  
20           and said locking sleeve.

8. A refrigerant material transfer device as described in claim 7 in which said one assembly prong is formed at angle toward said body or said locking sleeve not having said prong thereon.

9. A refrigerant material transfer device as described in claim 7 in which said body or said locking sleeve not having said prong thereon having a raised stop portion for restraining disassembly of said body and said locking sleeve.

10. A refrigerant material transfer device as described in claim 1 in which said body has said one locking tab integrally formed therewith, and said locking sleeve has at least one assembly prong, said body having a prong engaging surface for engaging said one assembly prong, said one prong having a bearing surface in contact with said prong engaging surface, said prong engaging surface having a stop surface for contacting said one prong and restraining disassembly of said body and said locking sleeve.

11. A material transfer device for transferring material from a pressurized container to another connector including:

a quick connect fitting for fluidically connecting to the connector, said quick connect fitting having

a one piece plastic body having one end for receiving material from the pressurized container and another end selectively attachable to and detachable from the connector, said plastic body having a fluid passageway extending from said one end to said other end and,

a plastic locking sleeve mounted on said plastic body for selectively locking and unlocking said body to the connector,

one of said body and said locking sleeve having at least one locking tab integrally formed therewith, said one locking tab having a hinge portion and a connector engaging lip pivotal about said hinge portion and engagable with the connector, said one locking tab moveable between a secured position in which said connector engaging lip is engageable by the connector and an

unlocked position, said body and said locking sleeve movable with respect to each other between a tab unlocking position and a tab locking position to lock said locking tabs in said secured position.

12. A material transfer device as described in claim 11 in which the other of said body and said locking sleeve contacts said one locking tab in said tab locking position to lock said locking tabs  
5 in said secured position.

13. A material transfer device as described in claim 12 in which said one locking tab has a raised portion, said raised portion in contact with said other of said body and said locking sleeve when in said tab locking position.

14. A material transfer device as described in claim 11 in which said one of said body and  
10 said locking sleeve has at least one aperture therein for receiving said one locking tab therein.

15. A material transfer device as described in claim 11 in which said one locking tab has an arm portion extending from said hinge portion to said connector engaging lip.

16. A material transfer device as described in claim 11 in which said one locking tab includes a plurality of locking tabs.

17. A material transfer device as described in claim 11 in which said body or said locking  
15 sleeve has at least one assembly prong and said body or said locking sleeve not having said one assembly prong having a prong engaging surface for engaging said one assembly prong, said one prong having a bearing surface in contact with said prong engaging surface, said prong engaging surface having a stop surface for contacting said one prong and restraining disassembly of said body  
20 and said locking sleeve.

18. A material transfer device as described in claim 17 in which said one assembly prong is formed at angle toward said body or said locking sleeve not having said prong thereon.

19. A material transfer device as described in claim 17 in which said body or said locking sleeve not having said prong thereon having a raised stop portion for restraining disassembly of said body and said locking sleeve.

20. A material transfer device as described in claim 11 in which said body has said one locking tab integrally formed therewith, and said locking sleeve has at least one assembly prong, said body having a prong engaging surface for engaging said one assembly prong, said one prong having a bearing surface in contact with said prong engaging surface, said prong engaging surface having a stop surface for contacting said one prong and restraining disassembly of said body and said locking sleeve.

21. A method of assembling a material transfer quick connect fitting device including the steps of

positioning the inlet end of a plastic body adjacent the assembly end of a plastic locking sleeve having a central aperture therethrough and having prongs formed integrally therewith,

moving said locking sleeve over said inlet end of said plastic body toward the outlet end of said plastic body with said central aperture of said locking sleeve partially receiving the outer surface of said body therein.

moving the assembly end of said locking sleeve towards the outlet end of said body to deform said prongs by contact with said outer surface of said body, and

positioning said prongs in a depression in said plastic body, wherein said depression has a stop surface to restrain movement of said assembly end of said sleeve towards said inlet end of said body, said body having a locking tab formed integrally therewith, said locking sleeve is spaced from said locking tab when said prongs are in said depression.

22. A material transfer quick connect fitting device made by the method as claimed in claim 21.

23. A method of attaching a refrigerant material transfer device to the connector on an automotive air conditioning system including the steps of:

5 positioning a quick connect fitting having a fluid passageway adjacent a fluid passageway of said air conditioning connector,

moving said fitting and said connector together to pivotally move the connector engaging lip of a locking tab formed integrally with a plastic body of the quick connector into engagement with a depression in the air conditioning connector so that said fluid passageways of said fitting and said  
10 connector are in fluid communication with each other,

moving the locking collar of said quick connect fitting along said body of said fitting to contact said connector engaging lip and lock said connector engaging lip in said depression of said connector.

24. A method of attaching a refrigerant material transfer device to the connector on an  
15 automotive air conditioning system as described in claim 23 in which the step of moving said fitting and said connector together includes the step of opening a valve in said fluid passageway of said connector.

25. A method of attaching a refrigerant material transfer device to the connector on an automotive air conditioning system as described in claim 23 in which the step of moving said fitting  
20 and said connector together includes the steps of pivotally moving said connector engaging lip away from said connector and pivotally moving said connector engaging lip towards said connector and into said depression.

26. A refrigerant material transfer device for transferring a refrigerant from a pressurized container to the connector on an automotive air conditioning system including:

an actuator adapted for attachment to the pressurized container for selectively receiving refrigerant material from the pressurized container,

5 a quick connect fitting fluidically connectable to the automotive air conditioning system,  
a fluid conveying tube fluidically connecting said fitting and said actuator to allow the flow of refrigerant material from said actuator to said quick connect fitting,

said quick connect fitting having

10 a one piece plastic body having one end attached to said tube and another end selectively attachable to and detachable from the air conditioning connector on the automotive air conditioning system, said plastic body having a fluid passageway extending from said one end attached to said fluid conveying tube to said other end for fluidically connecting to the automotive air conditioning system and,

15 a plastic locking sleeve mounted on said plastic body for selectively locking and unlocking said body to the air conditioning connector,

one of said body and said locking sleeve having at least one locking tab integrally formed therewith, said one locking tab having a hinge portion and a connector engaging lip pivotal about said hinge portion and engagable with the air conditioner connector, said one locking tab moveable between a secured position in which said connector engaging lip is engageable by the air conditioning connector and an unlocked position, said body and said locking sleeve movable with respect to each other between a tab unlocking position and a tab locking position to lock said locking tabs in said secured position, and

20

a check valve that allows refrigerant to flow into the automotive air conditioning system through the air conditioning connector and restrains flow of refrigerant out of the automotive air conditioning system, said check valve having

a check valve ball and

5 a plastic valve cage having an inlet end fluidically connected to said fluid passageway of said plastic body and having said ball positioned adjacent said inlet end of said valve cage, said inlet end of said valve cage having an enlarged body connecting portion with a front surface, said valve cage having an outlet and a valve cage fluid passageway extending between said inlet end and said outlet, said inlet end of said valve cage having at least one ball valve holding portion and at least one non  
10 sealing passageway adjacent said one ball valve holding portion to allow the flow of fluid around said ball and into said valve cage fluid passageway, said plastic body having an integral pocket formed to receive said enlarged body connecting portion of said valve cage therein and secure said valve cage to said body, said pocket having a retaining surface, said retaining surface in contact with said front surface of said valve cage to secure said valve cage in said pocket.

15 27. A material transfer device for transferring material from a pressurized container to another connector including:

a quick connect fitting for fluidically connecting to the connector, said quick connect fitting having

a one piece plastic body having one end for receiving material from the pressurized container  
20 and another end selectively attachable to and detachable from the connector, said plastic body having a fluid passageway extending from said one end to said other end and,

a plastic locking sleeve mounted on said plastic body for selectively locking and unlocking



said body to the connector,

one of said body and said locking sleeve having at least one locking tab integrally formed therewith, said one locking tab having a hinge portion and a connector engaging lip pivotal about said hinge portion and engagable with the connector, said one locking tab moveable between a  
5 secured position in which said connector engaging lip is engageable by the connector and an unlocked position, said body and said locking sleeve movable with respect to each other between a tab unlocking position and a tab locking position to lock said locking tabs in said secured position, and

a check valve that allows refrigerant to flow into the automotive air conditioning system  
10 through the air conditioning connector and restrains flow of refrigerant out of the automotive air conditioning system, said check valve having

a check valve ball and

a plastic valve cage having an inlet end fluidically connected to said fluid passageway of said plastic body and having said ball positioned adjacent said inlet end of said valve cage, said inlet end  
15 of said valve cage having an enlarged body connecting portion with a front surface, said valve cage having an outlet and a valve cage fluid passageway extending between said inlet end and said outlet, said inlet end of said valve cage having at least one ball valve holding portion and at least one non sealing passageway adjacent said one ball valve holding portion to allow the flow of fluid around said ball and into said valve cage fluid passageway, said plastic body having an integral pocket  
20 formed to receive said enlarged body connecting portion of said valve cage therein and secure said valve cage to said body, said pocket having a retaining surface, said retaining surface in contact with said front surface of said valve cage to secure said valve cage in said pocket.

28. A method of assembling a material transfer quick connect fitting device including the steps of

positioning a check valve ball in a chamber forming a portion of a fluid passageway extending from the inlet end of a plastic body,

5 moving the body connecting portion of a plastic valve cage into a pocket formed in said body adjacent said chamber to secure said check valve ball and said valve cage to said body with said check valve ball and said valve cage in fluid communication with said fluid passageway,

positioning the inlet end of said plastic body adjacent the assembly end of a plastic locking sleeve having a central aperture therethrough and having prongs formed integrally therewith,

10 moving said locking sleeve over said inlet end of said plastic body toward the outlet end of said plastic body with said central aperture of said locking sleeve partially receiving the outer surface of said body therein,

moving the assembly end of said locking sleeve towards the outlet end of said body to deform said prongs by contact with said outer surface of said body, and

15 positioning said prongs in a depression in said plastic body, wherein said depression has a stop surface to restrain movement of said assembly end of said sleeve towards said inlet end of said body, said body having a locking tab formed integrally therewith, said locking sleeve is spaced from said locking tab when said prongs are in said depression.

29. A material transfer quick connect fitting device made by the method as claimed in claim

20 28.

30. A quick connect material transfer device for attaching a container having tire sealant material to the valve of a tire for transferring tire sealant material from a pressurized container to the

valve of a tire including:

an actuator adapted for attachment to the pressurized container for selectively receiving tire sealant material from the pressurized container,

a quick connect fitting fluidically connectable to the tire valve,

5 a fluid conveying tube fluidically connecting said fitting and said actuator to allow the flow of tire sealant material from said actuator to said quick connect fitting,

said quick connect fitting having

a one piece plastic body having one end attached to said tube and another end selectively attachable to and detachable from the tire valve, said plastic body having a fluid passageway  
10 extending from said one end attached to said fluid conveying tube to said other end for fluidically connecting to the tire valve and,

a plastic locking sleeve mounted on said plastic body for selectively locking and unlocking said body to the tire valve,

one of said body and said locking sleeve having at least one locking tab integrally formed  
15 therewith, said one locking tab having a hinge portion and a connector engaging lip pivotal about said hinge portion and engageable with the tire valve, said one of said body and said locking sleeve has at least one aperture therein for receiving said one locking tab therein, said one locking tab moveable between a secured position in which said connector engaging lip is engageable by the tire valve and an unlocked position, said body and said locking sleeve movable with respect to each other  
20 between a tab unlocking position and a tab locking position to lock said locking tabs in said secured position.

31. A quick connect material transfer device as described in claim 30 having an end ring portion which has an outer stop portion for contacting the other of said body and said locking sleeve to limit relative movement of said body and said locking sleeve in one direction.

32. A quick connect material transfer device as described in claim 30 in which said one of  
5 said body and said locking sleeve has a stabilizing portion adjacent said connector engaging lip and defining a portion of said aperture for receiving said one locking tab therein.

33. A quick connect material transfer device as described in claim 32 in which said stabilizing portion has an end ring portion defining a portion of said aperture for receiving said one locking tab therein and defining one end of said one of said body and said locking sleeve.

10 34. A quick connect material transfer device as described in claim 32 in which said stabilizing portion has side portions defining a portion of said aperture for receiving said one locking tab therein, said side portions are adjacent to said one locking tab.

35. A quick connect material transfer device as described in claim 34 in which said stabilizing portion has an end ring portion defining a portion of said aperture for receiving said one  
15 locking tab therein and defining one end of said one of said body and said locking sleeve, said side portions formed integrally with said end ring portion.

36. A quick connect material transfer device as described in claim 30 in which the other of said body and said locking sleeve contacts said one locking tab in said tab locking position to lock said locking tabs in said secured position.

20 37. A quick connect material transfer device as described in claim 36 in which said one locking tab has a raised portion, said raised portion in contact with said other of said body and said locking sleeve when in said tab locking position.

38. A quick connect material transfer device as described in claim 30 in which said one locking tab has an arm portion extending from said hinge portion to said connector engaging lip.

39. A quick connect material transfer device as described in claim 30 in which one of said body and said locking sleeve having at least one locking protrusion integrally formed therewith, the other of said body and said locking sleeve having at least one raised portion for contacting said locking protrusion and restraining disassembly of said body and said locking sleeve.

40. A quick connect material transfer device as described in claim 30 in which said body or said locking sleeve has at least one assembly prong and said body or said locking sleeve not having said one assembly prong having a prong engaging surface for engaging said one assembly prong, said one prong having a bearing surface in contact with said prong engaging surface, said prong engaging surface having a stop surface for contacting said one prong and restraining disassembly of said body and said locking sleeve.

41. A quick connect material transfer device as described in claim 40 in which said body or said locking sleeve not having said prong thereon having a raised stop portion for restraining disassembly of said body and said locking sleeve.

42. A tire sealant material transfer device for transferring tire sealant material from a pressurized container to a tire connector including:

a quick connect fitting for fluidically connecting to the tire connector, said quick connect fitting having

a one piece plastic body having one end for receiving material from the pressurized container and another end selectively attachable to and detachable from the tire connector, said plastic body having a fluid passageway extending from said one end to said other end and,

a plastic locking sleeve mounted on said plastic body for selectively locking and unlocking said body to the tire connector,

one of said body and said locking sleeve having at least one locking tab integrally formed therewith, said one locking tab having a hinge portion and a connector engaging lip pivotal about said hinge portion and engagable with the connector, said one of said body and said locking sleeve has at least one aperture therein for receiving said one locking tab therein, said one locking tab moveable between a secured position in which said connector engaging lip is engageable by the connector and an unlocked position, said body and said locking sleeve movable with respect to each other between a tab unlocking position and a tab locking position to lock said locking tabs in said secured position.

43. A tire sealant material transfer device as described in claim 42 having an end ring portion which has an outer stop portion for contacting the other of said body and said locking sleeve to limit relative movement of said body and said locking sleeve in one direction.

44. A tire sealant material transfer device as described in claim 42 in which said one of said body and said locking sleeve has a stabilizing portion adjacent said connector engaging lip and defining a portion of said aperture for receiving said one locking tab therein.

45. A tire sealant material transfer device as described in claim 44 in which said stabilizing portion has an end ring portion defining a portion of said aperture for receiving said one locking tab therein and defining one end of said one of said body and said locking sleeve.

46. A tire sealant material transfer device as described in claim 44 in which said stabilizing portion has side portions defining a portion of said aperture for receiving said one locking tab therein, said side portions are adjacent to said one locking tab.

47. A tire sealant material transfer device as described in claim 46 in which said stabilizing portion has an end ring portion defining a portion of said aperture for receiving said one locking tab therein and defining one end of said one of said body and said locking sleeve, said side portions formed integrally with said end ring portion.

5 48. A tire sealant material transfer device as described in claim 42 in which the other of said body and said locking sleeve contacts said one locking tab in said tab locking position to lock said locking tabs in said secured position.

49. A tire sealant material transfer device as described in claim 48 in which said one locking tab has a raised portion, said raised portion in contact with said other of said body and said locking sleeve when in said tab locking position.

10 50. A tire sealant material transfer device as described in claim 42 in which said one locking tab has an arm portion extending from said hinge portion to said connector engaging lip.

51. A tire sealant material transfer device as described in claim 42 in which one of said body and said locking sleeve having at least one locking protrusion integrally formed therewith, the other of said body and said locking sleeve having at least one raised portion for contacting said locking protrusion and restraining disassembly of said body and said locking sleeve.

15 52. A tire sealant material transfer device as described in claim 42 in which said body or said locking sleeve has at least one assembly prong and said body or said locking sleeve not having said one assembly prong having a prong engaging surface for engaging said one assembly prong, said one prong having a bearing surface in contact with said prong engaging surface, said prong engaging surface having a stop surface for contacting said one prong and restraining disassembly of said body and said locking sleeve.

53. A method of attaching a tire sealant material transfer device to the connector on a tire including the steps of:

positioning a quick connect fitting having a fluid passageway adjacent a fluid passageway of the tire connector,

5 moving said fitting and said connector together to receive the outer surface of the tire connector in an end ring portion and stabilizing portions of said quick connect fitting,

continue moving said fitting and said connector together and pivotally move the connector engaging lip of a locking tab formed integrally with a plastic body of the quick connector into engagement with the outer surface of the tire connector so that said fluid passageways of said fitting  
10 and said connector are in fluid communication with each other,

moving the locking collar of said quick connect fitting along said body of said fitting to contact said connector engaging lip and lock said connector engaging lip to said tire connector.

54. A method of attaching a tire sealant material transfer device to the connector on a tire as described in claim 53 in which the step of continue moving said fitting and said connector together  
15 includes the step of opening a valve in said fluid passageway of said connector.

55. A method of attaching a tire sealant material transfer device to the connector on a tire as described in claim 53 in which the step of continue moving said fitting and said connector together includes the step of fluidically sealing said fitting and said connector together.